

Abstract of the Disclosure

Provided are methods of purifying and crystallizing *Streptococcus pneumoniae* acyl carrier protein synthase (AcpS) enzyme, crystals of AcpS, the use of such crystals to determine the three-dimensional structure of AcpS enzymes, and the three-dimensional structure of AcpS. The three-dimensional crystal structure of AcpS can be used in medical diagnostics to produce antibodies that permit detection of *Streptococcus pneumoniae* both *in vitro* and *in vivo*. The three-dimensional crystal structure of AcpS can also be used in pharmaceutical discovery and development to identify and design compounds that inhibit the biochemical activity of AcpS enzyme in bacteria. Inhibitory compounds identified in this way can be optimized by structure/activity studies to develop antibacterial pharmaceutical compounds useful for the prevention or treatment of bacterial infections.

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